

**From:** George E. DeVilbiss  
**To:** Commissioner Adelstein  
**Date:** Sun, Feb 2, 2003 2:53 PM  
**Subject:** Comments to the Commissioner

EX PARTE

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01-309

George E. DeVilbiss (geodvl@covad.net) writes:

In rereading my previous comments I see that I left out some of what I intended to say. Please ignore it and read the following:

I feel that my professional background qualifies me to make the comments below.

I have a BEE and MSE degrees from George Washington University's School of Engineering and have worked my entire life in the field of Electronics.

During WWII I was an instructor of Radar at MIT as well as at a British Radar School in Canada

I am a retired Naval Officer who served as an officer designated EDO (Engineering Duty Only, Electronics) and was Head, Electronics Division, Research and Development Directorate of the Navy's Bureau of Ships. I have at least 20 years experience in Electronics R&D.

I have a personal interest in hearing aid/cell phone compatibility issues because I am hard of hearing myself and would like to be able to use a digital cellular telephone without expensive and cumbersome "Add-ons".

I have read most of the comments submitted on proceeding 01-309 regarding HAC (hearing aid compatibility). Frankly I am shocked by the apparent lack of understanding of the problem evident by statements of the writers of comments and Ex Parte presentations made to various components of the FCC by the telephone industry.

I feel qualified to make the following statements because of my professional background. There are two sources of interference which make HAC difficult to accomplish:

First, RF energy is demodulated by the non linearity of the hearing aid's electronics and is amplified. This source of interference is present whether the hearing aid is using the microphone or the telecoil. Use of a directional antenna in the digital cellular telephones would be of great help as indicated by the results of Starkey Laboratories tests of such an antenna.

Second, low frequency magnetic flux is generated by the pulsing battery current of the telephone and interferes with the use of the hearing aid's telecoil. None of the comments from the telephone industry admit to this source of interference. The use of the telecoil is necessary for most hard of hearing persons to use a telephone successfully. This is why the HAC Act of 1988 was passed by the Congress.

To make all digital cellular telephones useable with all hearing aids the following must be done. All are technically feasible as will be explained. The cost should not affect the marketability of cellular telephones.

1. Make the hearing aid immune to RF energy by using shielding, installing RF filters in the hearing aid's electronics, and using directional antennas to direct the power away from the hearing aid. Starkey Laboratories tests of a directional antenna indicate great success with it. Shielding can be done by coating the covers with conducting material. Neither this shielding nor the incorporation of RF filters in the integrated circuits of the hearing aids electronics will necessitate any increase in size. Of course requiring any necessary

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redesign of the hearing aid is not the responsibility of the FCC but perhaps the use of a directional antenna can be.

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2. Eliminate or lessen, by use of self cancellation, low frequency magnetic flux which causes interference.

This concept was demonstrated to FCC personnel in April 2002. This will require redesign of the telephone's battery and its connection to the telephone. The installation of coaxial cable from the battery to the telephone's electronics would bypass the "helter skelter" circuit traces presently carrying the battery current. Because of the small size of the case of existing cellular telephones a very small coaxial cable could be used since its length would be very short and its resistance would be no problem.

The use of self canceling magnetic flux is apparently little understood. A study of technical literature will find little about it. The effectiveness of it was demonstrated to FCC personnel as stated above. A method of its use is described in some of my early comments in response to Proceeding 01-309

3. Make the desired audio magnetic flux strong enough to couple with the hearing aid's telecoil. Use of a dynamic type of speaker as used on wireline telephones can probably accomplish this. Many analog cellular telephones which have no RF or low frequency magnetic flux interference have sufficient magnetic signal strength to successfully couple to the telecoil in hearing aids and could be successfully used in digital cellular telephones,

Since solutions are technically feasible, I sincerely believe that if the exemption of Wireless telephones from the HAC Act of 1988 is revoked that the telephone industry would or could make all digital cellular telephones useable with all RF immune hearing aids.

Sincerely,  
George DeVilbiss

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Server protocol: HTTP/1.1  
Remote host: 64.105.100.16  
Remote IP address: 64.105.100.16